

Notice of Allowability

Application No.

10/726,081

Examiner

Terressa M. Boykin

Applicant(s)

DRUMRIGHT ET AL.

Art Unit

1711

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 4-8-05.
2. ☒ The allowed claim(s) is/are 1,6-12,17,21-26 and 32.
3. ☒ The drawings filed on 12-1-05 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying Indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Terressa M. Boykin
Primary Examiner
Art Unit: 1711

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Gary Cohn on July 11, 2005.

The application has been amended as follows:

In claim 25 the recited (and recently amended) "claim 5" has now been changed to recite –claim 6–.

Correspondence

Please note that the cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants may be referred to the

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Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Terressa Boykin whose telephone number is 571 272-1069. The examiner can normally be reached on Monday through Friday from 6:30am to 3:00pm.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. The general information number for listings of personnel is (571-272-1700).

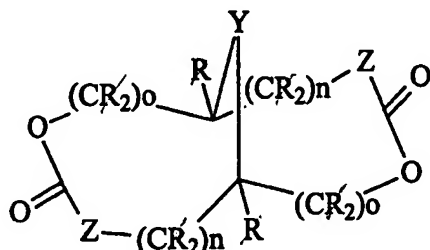
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tmb


Examiner Terressa Boykin
Primary Examiner
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Current Status of All Claims in Application/
Amendments

1 (currently amended). A thermoplastic or crosslinked copolymer having, in polymerized form, units derived from a (a) monocyclic ester or corresponding hydroxy acid or (b) a monocyclic carbonate, or both (a) and (b), and units derived from a bicyclic diester and/or carbonate having the structure



wherein each R is independently lower (C₁₋₄) alkyl or hydrogen, each Z is —O— or a covalent bond, each n and each o are independently zero or a positive integer, provided that the values of n and o, taken together, are such that the main ring contains 6 or 7 members when each Z is a covalent bond and 8 or 9 members when each Z is —O—, and Y is —(CR₂)_m— where m is 1, 2 or 3, wherein the copolymer contains from about 0.05 to about 1.5 weight percent, based on the total weight of the copolymer, of units derived from a bicyclic diester and/or carbonate.

2-5 (canceled).

6 (currently amended). The copolymer of claim 1 ~~5~~, wherein the monocyclic ester is lactide.

7 (original). The copolymer of claim 6 wherein the bicyclic diester is 2,5-dioxabicyclo[2.2.2]octane-3,6-dione.

8 (original). The copolymer of claim 7 that has a number average molecular weight of from about 10,000 to about 500,000, as measured by the GPC/DV method.

9 (original). The copolymer of claim 8 wherein the copolymer is semicrystalline and contains from about 98.4 to 99.9 percent of units derived from either the D or L isomer of lactic acid, based on the total moles of the lactic acid units, and from about 0.1 to about 1.6 percent of units derived from the other isomer, based on the total moles of the lactic acid units.

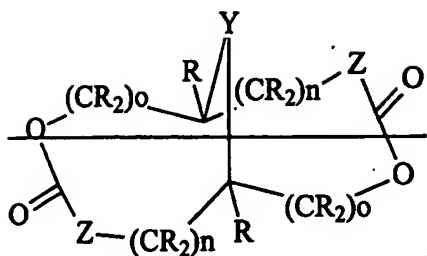
10 (original). The copolymer of claim 9 which contains from about 0.3 to about 1.0 weight percent, based on the total weight of the copolymer, of repeating units derived from the bicyclic diester.

11 (original). The copolymer of claim 8 wherein the copolymer contains up to about 98 percent of units derived from either the D or L isomer of lactic acid, based on the total moles of the lactic acid units, and about 2 percent or more of units derived from the other isomer, based on the total moles of the lactic acid units.

12 (original). The copolymer of claim 11 that contains from about 0.3 to about 1.0 weight percent, based on the total weight of the copolymer, of units derived from the bicyclic diester.

13-16 (canceled).

17 (currently amended). A method comprising subjecting a mixture including ~~monocyclic ester and/or carbonate~~ lactide and a bicyclic diester and or carbonate to conditions sufficient to polymerize the mixture to form a copolymer having units derived from the monocyclic ester and/or carbonate and repeating units derived from the bicyclic diester and or carbonate, wherein the bicyclic diester and/or carbonate is 2,5-dioxabicyclo[2.2.2]octane-3,6-dione. ~~has the structure~~



~~wherein each R is independently lower (C₁₋₄) alkyl or hydrogen, each Z is O or a covalent bond, each n and each o are independently zero or a positive integer, provided that the values of n and o, taken together, are such that the main ring contains 6 or 7 members when each Z is a covalent bond and 8 or 9 members when each Z is O, and Y is (CR₂)_m where m is 1, 2 or 3.~~

18-20 (canceled).

21 (currently amended). The method of claim 17 19 wherein the copolymer contains at least about 98 weight percent of units derived from either the D or L isomer of lactic acid, and up to about 2 weight percent of units derived from the other isomer, based on the total weight of the lactic acid.

22 (original). The method of claim 21, wherein the bicyclic diester and/or carbonate constitutes about 0.3 to about 1.0 weight percent, based on the total weight of the monomers.

23 (currently amended). The method of claim 17 19 wherein the copolymer contains no more than about 98 weight percent of units derived from either the D or L isomer of lactic acid, and at least about 2 weight percent of units derived from the other isomer, based on the total weight of the lactic acid.

24 (original). The method of claim 23, wherein the bicyclic diester and/or carbonate constitutes about 0.3 to about 1.0 weight percent, based on the total weight of the monomers.

25 (currently amended). The copolymer of claim 6 5 which has a melt flow rate at 210°C and under a weight of 2.16 kg of from about 4-12 g/10 min ~~and~~ has a melt tension of at least about 2 cN.

26 (previously presented). The copolymer of claim 25 which has a melt tension of at least 12 cN.

27-31 (canceled).

32 (original). The copolymer of claim 25 which has a melt tension of at least 6 cN.

33 (canceled).

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ABSTRACT

Copolymers having repeating units derived from monocyclic esters or carbonates and certain bicyclic diesters and/or carbonates have controllable rheological properties. The bicyclic diester and/or carbonate copolymerizes easily with the monocyclic monomers, especially with lactide, to form copolymer that can have tailored levels of branching. The copolymers have excellent rheological properties, including increased melt tensions and improved shear thinning, compared to the analogous linear polymers.